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BY

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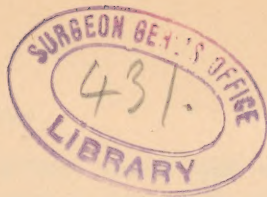
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A FORM OF POLY-NEURITIS, PROBABLY ANAL-  
AGOUS TO OR IDENTICAL WITH BERI-BERI,  
OCCURRING IN SEA-FARING MEN IN  
NORTHERN LATITUDES.<sup>1</sup>

BY JAMES J. PUTNAM, M.D., OF BOSTON.

ON the 21st of last October a man, thirty-nine years old, the mate of a fishing-vessel that had just arrived from the Grand Banks, was referred to me by my friend, Dr. M. A. Morris, of Charlestown, and gave the following account of his condition:

He was suffering from weakness in both arms and legs to such an extent that he could walk only with difficulty. His legs felt numb and prickly, and he had observed an actual loss of sensibility of the skin. This feeling of numbness extended up the legs and thighs and over the lower part of abdomen to the umbilicus. The arms were in a similar condition, but to a less degree. No affection of the face or eyes had been noticed. There was no pain anywhere, and no affection of the sphincters of the bladder or rectum. He said the legs were swelled, but not so much so as they had been a short time before; the calves and the inner surface of the thighs felt sore and lame.

He reported that he had been well up to two weeks previously. The first symptom noticed was pain on the inner surface of the thighs, on the 7th of October. The next day he felt sick, and the legs and thighs were swelled. He kept in his bunk for several days, feeling weak and depressed, with a steady diminution of strength in legs and feet. After this he had improved only slightly. He had had no fever, so far as he knew.

On examination the patient was found to be pale, with a yellowish cast to the face. His gait was waddling,

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<sup>1</sup> Read at the Annual Meeting of the American Neurological Association in Philadelphia, June, 1890.



the legs being used like stumps, and the feet brought down flat on the ground, as if simply hinged at the ankle. He had considerable difficulty in getting his coat off and on. In going down-stairs he was obliged to turn sideways and to bring both feet down upon each step. There was slight toe-drop, and marked swaying of the body when the patient stood with the eyes shut. There was no inco-ordination in the arms or hands. The grasp by the hand was feeble on both sides, more so on the left. Extension of the fingers and carpus was imperfect on both sides. The sensibility of the hand to touch was so nearly perfect that the patient could feel the lightest contact with my finger everywhere. The sensibility to contact in the feet and legs was but little below the average, but the character of the sensation imparted was not quite normal. The prick of a pin was promptly and distinctly felt, and, indeed, the patient's answers suggested some degree of hyperæsthesia. A very light touch was also felt over the abdomen below the umbilicus, but, as compared with the area above the umbilicus, the sensibility of the affected portion was slightly impaired, or, at least, the contact gave rise to a feeling of a different kind in the two parts. A piece of metal of the temperature of the room was distinctly felt as cold whenever tested. The knee-jerk was absent on both sides, even during "re-enforcement."

The calves of both legs were large and tender, distinctly more so than normal, by the patient's account, and there was pitting on pressure along the shins. The muscles over the inner surface of the thighs were also tender to deep pressure, and to a slight degree the muscular masses of the arms. No enlargement of the spleen could be made out. Inquiry into the patient's previous history showed that he had been in all respects a temperate man. The pulse was 78, full and strong; temperature, 99° F. in the mouth.

To revert to the surroundings of the patient before the attack came on, it appeared that for nearly six months before his sickness he had been on a fishing-vessel off the Grand Banks. The vessel had been insufficiently

provisioned, and the captain had insisted on protracting the trip, so that for some time the crew had had little else to eat except molasses, fried pork, and pan-cakes, and the water had been foul. Nine or ten other men besides the patient had been affected like himself, and most of them more seriously. The first one was attacked two months before he was, namely, in August. Their legs were badly swelled, so that the pitting on pressure was frequently noticed.

I learned, further, that some of these men had been treated at the Marine Hospital, and I was enabled, shortly afterward, through the kindness of the surgeon in charge, Dr. Fairfax Irwin, to learn something of their history and to examine the one or two that remained. Dr. Irwin reported to me that, on account of the œdema, the malnutrition, and, in one or more of the cases, the typical purpuric condition, he had made the diagnosis of scurvy; and it certainly seems highly probable that this affection accounted for at least a part of the symptoms.

Of the two patients remaining in the hospital, one was a typical example of multiple neuritis, presenting well-marked wrist-drop and toe-drop, impairment of sensibility of the hands and feet, and more or less tenderness on deep pressure into the muscular masses of the arms and legs. He had been improving, and soon afterward left the hospital.

Some months after these cases were brought to my notice, a patient presented himself at the Massachusetts General Hospital, presenting the symptoms of multiple neuritis in even a more severe form than either of the cases already described, and bringing a note from his physician, Dr. Stone, of Wellfleet, saying that he had seen several other cases of the kind. The patient was a seaman, twenty-one years old, single, in good circumstances, and with absolutely no history of constitutional disease. He had been well up to the 1st of July, 1889. At that time he was in a fishing-vessel off Block Island, near Newport, R. I., having left his home in Wellfleet early in June. The vessel was well-provisioned. The first symptom



consisted in a sense of numbness in the feet, which began at the toes and rapidly spread upward, but never reached more than midway up the thigh. Soon afterward the fingers also began to be numb, and the disturbance extended up the arms. At the time of the illness he was feeling as strong and healthy as ever in his life.

The weakness of the arms and legs began at the same time with the numbness. Soon after the hands had begun to be affected—that is, the 26th of August—the patient began to suffer severely from dysentery of a serious character, which lasted for two weeks, and was followed by a severe diarrhoea, which continued for three months. He remained in bed all the time, having a very large number of movements daily, and indeed his legs became so weak that when he tried to stand he found it impossible to do so.

In July, soon after the symptoms began, the legs, as well as the lower half of the thighs, began to swell, and became highly œdematous, pitting deeply on pressure. At the same time he suffered from severe pain, mainly along the shin, accompanied by marked soreness on pressure. It is possible that this pain was due to the swelling, since the feet were not painful. There was no pain in the arms. During a great part of his illness he was on shore, having left the ship after having been sick for a week or two. During the height of his sickness he had some attacks of unconsciousness, lasting for an hour or so, accompanied by high fever, which was thought to be of malarial origin. For two or three weeks, just after the dysenteric attack, he was unable to control the sphincter of the bladder. At the time I saw him he had improved considerably, both as regards the paralysis, which had been so great that all motion of the toes and feet was abolished, and the muscular wasting, which had been very marked.

The patient reported further that all the men aboard the ship, eight in number, were affected like himself to a greater or less degree, except that only one had the dysenteric symptoms.

The paralysis was about equally great with them all, but did not, in most cases, last so long as with him. The

other member of the crew who had dysentery was attacked with it at about the same time with himself, and afterward died.

The physical examination of the patient showed his condition to be typical of the so-called multiple neuritis, if not, indeed, something worse. No motion was absolutely impossible, but a high degree of toe-drop was present and the extensors of the carpus and fingers were much affected. He walked slowly and with the aid of a cane.

The examination of the sensibility showed that the sense of contact on the foot was slightly blunted to a little above the ankle. He was a good deal at a loss to localize the sensation, mistaking the sole of the foot for the dorsum, etc. The outer side and back of the foot seemed to be more affected than the sole. There was considerable delay in conduction. A piece of metal of the temperature of the room was sharply felt, even on the great toe. His sense of position seemed slightly impaired, so that he had difficulty in standing with the eyes closed, and he failed to state correctly the position of the toes. The foot felt cold to the touch. There was no static ataxia of the hand, and the sense of contact was apparently normal for the tips of the fingers. Two points were distinguished at about 1 mm. The electrical reactions for the muscles of the legs were much diminished. (Vastus internus and rectus femoris; F. reaction, 6.5 (normal, 11-12). Sartorius reaction almost normal. All the muscles below the knee reacted to F. at about the same strength of current as above. G. reactions; no local contractions from weak or moderate currents. Currents of 20 m.a. caused rather feeble reactions everywhere,  $- > +$ . The peritoneal nerve reacted to 5 m.a. at first, the tib. anticus responding; but, after one or two closures, the contractions died away and could not be obtained.)

In October, 1881, Dr. F. C. Shattuck reported in the "Boston Medical and Surgical Journal" a series of cases evidently identical with those to which I have referred and occurring under precisely similar conditions.

The patients were fifteen in number, and embraced all



but four of the officers and crew of a fishing-vessel, the *Nellie Swift*, that sailed from Provincetown for the Grand Banks on June 5, 1880. The first patient fell sick on August 1st, complaining of soreness in the calves of the legs and a dead feeling in his ankles, which was soon followed by swelling in those parts. The subsequent symptoms in this and the other cases consisted in extensive and severe anasarca, pain and numbness. One of the patients died, having presented the above symptoms and, in addition dyspnœa, with effusion in the chest. The urine also had been scanty and high-colored, free from albumen, but containing a few granular casts. An account of the autopsy was sent to Dr. Shattuck by Dr. J. M. Crocker, of Provincetown, under whose care the patient had been. Serum had been found in the pleura, pericardial and peritoneal cavities. The heart was flabby, but otherwise normal. The kidneys were normal in appearance and size. The spleen was unusually small. Dr. Crocker further reports that none of the cases had, so far as he knew, presented hemorrhages or other symptoms of scurvy beyond œdema of the ankles; and, further, that the drinking-water which was used on the ship was thick and ropy.

As has been stated, the vessel was off the Grand Banks when the sickness broke out. During the previous winter, however, it had been engaged in the fruit trade in the West Indies, visiting Nassau among other places. The provisioning of the vessel had been practically the same as that of other vessels in the same trade. In a letter written a few months later, Dr. Shattuck also referred to the epidemic which broke out on a Brazilian man of war, said to have been improperly provisioned and in an unhygienic condition. Leaving Brazil, the ship sailed for Europe, touched at points in the Spanish Peninsula, and passed through the Suez Canal to Aden, where the disease, which was manifestly of the same character with that of the cases already reported, first broke out. The cases were treated in the Marine Hospital in San Francisco, and an account of them was published in the hospital reports. Dr. Shattuck concluded that the cases must be of the nature of Beri-Beri,



and quotes Dr. Roosevelt as having described a series of cases which occurred on the *Henry S. Sanford*, which sailed from Hong Kong for New York, July 20, 1886. Of a crew of eighteen, twelve were attacked, and several cases were fatal. The outbreak of these epidemics on the last two vessels named is perhaps remarkable from the fact that it occurred so long after the vessel had left the Southern ports where Beri-Beri is to some extent endemic. In one case the interval was three months, and in the other six months. I have a number of references to other cases where the same fact was observed. In the two sets of cases to which I have referred, even this explanation is wanting, and we are obliged to fall back on the conclusion that some infectious form of multiple neuritis occurs in northern latitudes, a view supported by the occasional occurrence of such cases as that described by Rosenheim and published in Vol. XVII. of the "*Archiv. f. Psychiatrie*," and the one reported by myself at the meeting of this society in 1888. Both were severe cases of acute generalized neuritis, running a rapid and fatal course, but without œdema.

Wishing to learn whether other cases of this sort had been observed by physicians in the seaboard towns, I sent out a number of circulars, and obtained fifteen answers, of which those from six physicians—Drs. Wm. S. Birge, of Provincetown; S. F. Quimby, of Gloucester; G. B. Stevens, now of Roxbury; S. T. Davis, of Orleans; Benj. D. Gifford, of Chatham; W. N. Stone, of Wellfleet; and E. E. Hawes, of Hyannis—are of decided interest.

Dr. Birge reported having seen seven cases, five from one vessel and two from another, belonging to a fishing-fleet which had returned from the Grand Banks. Two of the cases had proved fatal. The symptoms described were evidently identical with those of the cases reported by Dr. Shattuck and myself. One of the vessels may have been the same with that from which my first patient had come.

Dr. Quimby had seen the master of a fishing-schooner who had these characteristic symptoms, pain, and paralysis in the lower extremities being very marked. The symptoms had come on, as he thought, as a sequel to the influ-

enza of the past winter, but as I have been looking in vain for cases of neuritis following the influenza, I think this explanation is not probable.

Dr. Stevens called my attention to a case which he had reported in the "Boston Medical and Surgical Journal," June 16, 1887, occurring in the mate of the barque Charles G. Rice, which arrived in Boston, May 12th, of the same year, from Manilla, after a passage of one hundred and twenty days. The symptoms in this case were essentially diarrhœa, œdema, and, eventually, numbness of the legs without paralysis. The point of particular interest in this case is that the patient was well when he left the port of Manilla and became ill about a month after that time.

Dr. Davis had seen "a lot of cases where men who had handled fish complained of numbness and great swelling of the hands and great difficulty in using the extensors." He had considered these due to the irritating action of the fish on the hands. In view of the uniformity of employment of all the men, this explanation should receive full weight; but the fact that a much larger number of cases seems, as far as we know, to have occurred in certain years than in others, it would seem that neither this nor any other local cause could be the only one at work.

Dr. Gifford had seen one patient, a sea-captain, with symptoms that might perhaps be of this character.

Dr. Stone has sent me the notes of five cases, of which at least three may have been of this class. The diagnosis is, however, not certain, and in some of the cases other well-known causes of general neuritis were present.

The first of these patients was a man of forty years; a seaman, of temperate habits, and free from constitutional diseases, so far as is known. The symptoms had consisted in progressive numbness of the legs reaching to the knees, and toe-drop, the whole increasing to its maximum in a few weeks. He improved to a certain point, but never entirely regained the use of the extensors of the foot. This case occurred two years ago.

The next patient was a man of forty-five years, who had followed the sea until the last five years, since when his



occupation has been that of a sailmaker, his place of business being on the beach, where he was exposed to wet and damp. Three years ago he was attacked with what appeared to be sciatica of one leg, soon extending to the other, and lasting for a number of months. From this he recovered, but a year ago it returned and remained for some three months. Three weeks ago he was again attacked with severe pain in the limbs and feet, the hands becoming badly swollen. The swelling subsided after a time in the hands, but attacked the feet, and at present is spread over the whole length of both legs. The pain is still very severe.

The next case is that of a man of thirty-five; of previously good health, temperate habits, and free from constitutional diseases; he had always followed the sea. His symptoms had consisted in an acute onset of pain in both legs and in general in the distribution of the sciatic nerve. This pain was worse in the afternoon and evening, as a rule. It subsided in the course of a week or two, but for three months more his muscles were so weak he was unable to walk even with crutches. Four or five months later he could go about with difficulty, and before the end of a year he was able to go to sea again, though still, at the end of nine years, showing some awkwardness in his gait, and using the feet as if they were of wood.

The fourth case was a man of sixty-three. It was a typical case of multiple neuritis, but is not reported here at greater length because the habits of the patient suggested that alcohol may have been the cause of his sickness.

The fifth case was that of a man thirty-five years old; always in good health, and a member of the life-saving service crew, his duty being to patrol the beach at night. The beach, when not frozen, was sandy, making the walking difficult. A year ago he came to Dr. Stone complaining that while walking his toes felt as if there was sand in his shoes, and that this feeling had increased of late. He had noticed that on going down a sharp decline the knees were apt to give way, so that he would fall. Of late the numbness had extended to the calves of the legs, and he had

recently had pain through the abdomen to the back, and down the thighs.

Dr. Stone was kind enough to give me these notes from his memory, but I thought it better to put them in on account of the obscurity concerning the etiology of this class of cases, thinking they might throw some light upon it.

Dr. Hawes, of Hyannis, says: "About seven months ago I had a fisherman (I am hospital surgeon of this port) come to me with an ulcer on his leg. I treated it, and he went again to his vessel. He said: 'A few weeks ago I was taken lame, hardly able to stand erect, and I feared I should be paralyzed.' It seems, as he rallied from that, the sore formed. I judged it might be rheumatism, and so can say no more about it. But since receiving your letter I have thought it might be the Beri-Beri that the man tried to explain, and that the sore might have been an ulcer following the above-named trouble."

To sum up, it would seem that in 1881 and in 1889 there were epidemics of this infectious disease, whatever name it may deserve, occurring among the crews of vessels fishing along our northern shores, and that sporadic cases of the kind have occurred during the interval.

The group of cases that I have seen or heard of amounts to fifteen or twenty, exclusive of Dr. Shattuck's fifteen, and exclusive of those reported in answer to the circular, the number of vessels being five, three of them from the Grand Banks and one from off Block Island.

I have received a letter, within a few days, from one patient, whose case I have reported, saying that he still suffers from numbness of the feet and toe-drop, though it is now about a year since he was first attacked, and saying further that another of the crew is still quite sick. It is possible that, either primarily or secondarily, the spinal cord was affected as well as the peripheral nerves. He further notes that his vessel was a mackerel fisherman, while those off the Grand Banks were cod fishermen. The possibility of infection from the fish should be considered, and the letter from Dr. Davis is interesting in this connec-



tion. He also says that the vessel on which he and his crew were employed had not at any time been engaged in the Southern trade, so that this possible cause of infection, which was present for Dr. Shattuck's cases, was not present here.







